MATHEUS et al   **Atty Dkt: 2380-893**
Serial No. 09/867,711   **Art Unit: 2664**

REMARKS/ARGUMENTS

Reexamination of the captioned application is respectfully requested.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicants basically:

1. Editorially amend the specification.

2. Decline amending the entire specification to include paragraph numbers, which is not believed to be a requirement, but offer to provide a substitute specification with paragraph numbers if such would be helpful.

3. Amend all claims, e.g., to delete reference numerals and the like.

4. Add new claims 23 – 27.

5. Respectfully traverse all prior art rejections.

6. Advise the Examiner of the simultaneous filing of a Petition to Extend.

B. THE SIMULTANEOUS AMENDMENT

Apparently the simultaneous amendment submitted upon filing of the captioned application was not entered. That simultaneous amendment eliminated multiple claim dependency from claims 4 and 14, and add new dependent claim 23. In view of non-entry or non-receipt of the simultaneous amendment, essentially the same amendments (eliminating multiple claim dependency from claims 4 and 14 and adding new dependent claim 23) is accomplished by this Amendment.

C. THE NEW CLAIMS

New dependent claim 23 originates from the alternative original dependency of dependent claim 14 (dependent upon claim 11). New dependent claim 24 resembles

- 17 -

MATHEUS et al
Serial No. 09/867,711

Atty Dkt: 2380-893
Art Unit: 2664

claim 15, but depends from new dependent claim 25. New dependent claim 26 and new dependent claim 27 are taken from Equation 10. New dependent claim 28 is supported, e.g., by Equation 11.

D. PATENTABILITY OF THE CLAIMS

Claims 1-2 and 7-9 stand rejected under 35 USC 102(e) as being anticipated by U.S. Patent 6,359,938 to Keevill et al. Claims 3-6 and 11-22 stand rejected under 35 USC §103(a) as being unbatentable over U.S. Patent 6,359,938 to Keevill et al in view of the Speth et al article. All prior art rejections are respectfully traversed for at least the following reasons.

Independent claims 1, 14, and 16 require selection and use of M number of selected sub-carriers and their corresponding M channel coefficients (C_{est}), to determine an estimate ($f_{off,est}$) of the frequency deviation (f_{off}) introduced into the multi-carrier symbols. The number M of sub-carriers are those (of the N channel coefficients (C_{est})) corresponding to the M channel coefficients (C_{est}) having the largest absolute values, where M≤N.

As stated in the first full paragraph on page 25 of Applicants' specification, "instead of using all N sub-carriers for the evaluation in the evaluator EVAL, only the data transmitted on the M sub-carriers with large channel coefficients are used for the evaluation."

In the text bridging pages 4 and 5 of the Office Action, col. 5 (lines 58 – 65) of U.S. Patent 6,359,938 to Keevill et al. is alleged to teach the claimed selection of M number of subcarriers. Though unevenly referenced, the cited portion appears to pertain to pilot location circuitry. Pilot location is important to Keevill, as it appears that Keevill actually uses reference pilots in order to calculate the common phase error for every

- 18 -

MATHEUS et al   **Atty Dkt: 2380-893**
Serial No. 09/867,711   **Art Unit: 2664**

OFDM symbol (*see,* e.g., col. 33, lines 37 – 50; col. 27, lines 11+; col. 26, lines 55 - 68). Keevill's pilot carriers are inserted in addition to data carriers for purposes such as synchronization (*see,* e.g., top of col. 3 of Keevill).

Keevill calculates an order of pilot carriers and their magnitudes, but *does not teach a selection among pilot carriers (or any carriers) based on absolute value of channel coefficients.* As such, Keevill cannot anticipate or render unpatentable claims 1, 14, or 16 (or any claims dependent thereon). Further, Keevill does not teach or suggest deriving a subset of carriers from "N channel coefficients (C_{est}) corresponding to *each sub-carrier as estimated by a channel estimator*". Moreover, Keevill's selection does not appear to be based on *channel coefficients* (C_{est}) having the largest absolute values.

Independent claims 11, 20, and 23 require a corrector unit arranged downstream of a receiver multi-carrier filter bank and adapted to rotate all data symbols output by the receiver multi-carrier filter bank with the same phase shift depending on the frequency deviation estimate ($f_{off,est}$). In this regard, *see,* e.g., the top of page 36 of Applicants' specification as stating (for the "second aspect of the invention")

that the correction of the offset is done in a forward correction manner without delay after the FFT unit 8. That is, *the estimate is not fed back but is used in a forward loop to correct to offset of the data symbols which have just been evaluated in the evaluator 14, i.e. the i-th symbol is corrected with the estimate of the i-th symbol. By contrast, in the prior art frequency tracking device FTD in Fig. 3 the correction unit 13-2 only carries out a correction of the (i+1)-th data symbol.* The forward correction significantly improves the performance and therefore accuracy of the evaluation process used in the evaluator 14. (Emphasis added)

- 19 -

MATHEUS et al   **Atty Dkt: 2380-893**
Serial No. 09/867,711   **Art Unit: 2664**

The Office Action properly admits that this and other subject matter of independent claims 11, 20, and 23 is not taught by U.S. Patent 6,359,938 to Keevill et al. The Office Action seeks to remedy the deficiency of U.S. Patent 6,359,938 to Keevill et al. respecting Applicants' independent claims 11, 20, and 23 by alleged combination with the Speth et al article.

Applicant has noted reference in the Office Action to, e.g., Equations (7) and (8) of Speth. Those equations or other cited portions of Speth do not seem to overcome the clearer teaching of Speth on page 574, second column, last full paragraph:

> When the carrier frequency detector (CFD) has generated an estimate of $\Delta f'_F$ and/or n_I, carrier frequency correction is effectuate by adjusting the I/Q mixer NCO _shortly before the beginning of the next (pre-FFT) OFDM symbol_. Likewise, when the sampling frequency detector (SFD) has generated an estimate of ζ, sampling frequency correction is done by adjusting the resampling NCO _shortly before the beginning of the next (pre-FFT) OFDM symbol_. (Emphasis added)

Therefore, the postulated combination of U.S. Patent 6,359,938 to Keevill et al. and Speth et al article, even if assumed proper, is unavailing.

Should the Examiner persist with same or similar rejections, Applicants would appreciate a detailed rebuttal of Applicants' arguments so that any basis of misunderstanding can be clearly discerned. But as the record stands, Applicants believe the Examiner (aided by remarks herein presented) has ample bases for withdrawing all pending rejections.

- 20 -

MATHEUS et al   **Atty Dkt: 2380-893**
Serial No. 09/867,711   **Art Unit: 2664**
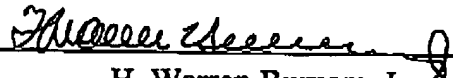
D. MISCELLANEOUS

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____

H. Warren Burnam, Jr.
Reg. No. 29,366

HWB:lsh
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

- 21 -